

The Amateur Radio

\$2.00 US

COMMUNICATOR

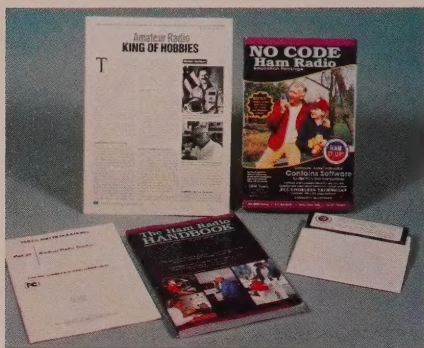
JANUARY/FEBRUARY 1992

Volume 2 Number 1

- *All About Amateur Radio Call Signs*
- *Teaching Morse Code*
- *Going on a Fox Hunt*
- *Propagation Basics*



AVAILABLE FROM NARA



Pass The New Codeless Technician Test!

Everything you need to pass the new codeless Technician Class exam! The **NARA Educational Package** includes:

- *The Ham Radio Handbook*, the indispensable book that guarantees you'll pass the test or your money will be refunded!
 - Software for testing your knowledge (IBM 5¼")
 - Ham radio *FCC Rules and Regulations, Part 97*
 - *Amateur Radio—King of Hobbies* (a publication that introduces you to Amateur Radio)
 - An extensive list of Contact Volunteer Examiners
- The **NARA Educational Package (IBM)** is just **\$29.95 (\$3.00 S&H)** #P110.

Having Trouble with Code?

The **Morse Academy**, IBM compatible software, actually teaches all 43 required code characters and then steps you up through the Amateur Extra 20-wpm level using sophisticated computer aided instruction techniques. Adjustable tone, standard or Farnsworth spacing. Sends text or randomly generated characters—even properly constructed code exams! Many features—plus a 40-page on-disk manual! (5¼" disk) is only **\$14.95 (\$1.50 S&H)** #S410.

Amateur Radio—King of Hobbies For Those Who Want To Learn About Amateur Radio

A great publication to hand out at public events or whenever people ask "What is Amateur Radio and how do I get started?" It covers what ham radio is; who ham radio operators are; the various types of operations that ham radio operators engage in and tells the reader how to get a ham license. The publication also includes an extensive list of the Contact Volunteer Examiners, so anyone wanting a license can find someone in their local area to contact. Attention Ham Dealers and Hobby Store Owners! This publication is a great way to attract people to your business and save valuable staff time by explaining what Amateur Radio is all about.

- 10 copies **\$3.50 (\$2.00 S&H)** #K800
- 20 copies **\$7.00 (\$2.50 S&H)** #K801
- 50 copies **\$17.50 (\$3.00 S&H)** #K802

**Order Toll Free
1-800-GOT-2-HAM
(1-800-468-2426)**

or use the order form on page 17

New! HamWare™ Testing Software

The new **HamWare**, IBM compatible (5¼" and 3½" disks) testing software, provides all the practice you need to get your first license or to upgrade. Drawings and diagrams appear automatically on screen along with the appropriate questions, and there's even a practice mode, complete with hints, answers and help screens. As a bonus, there's a handy on-screen scientific calculator. Your choices are mouse or keyboard selectable. As a bonus, each disk includes a copy of **Morse** software for learning Morse code.

- HamWare Novice/Technician Classes w/Morse #210
- HamWare General Class w/Morse #211
- HamWare Advanced Class w/Morse #212
- HamWare Extra Class w/Morse #213

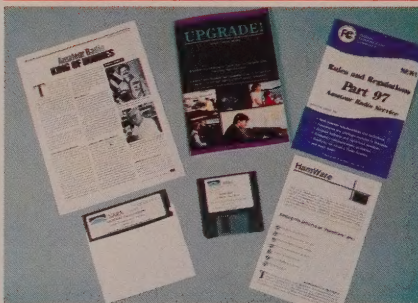
The entire **HamWare** series is available at major Amateur Radio equipment dealers, or you can order from NARA. Licenses classes are sold individually. Each class is only **\$14.95 (\$2.00 S&H)**.

New! NARA Amateur Radio Training Package

Start with your Novice or no-code Technician license and go "all the way" to Extra class with this excellent IBM compatible training package that includes:

- HamWare Novice/Technician Classes w/Morse
- HamWare General Class w/Morse
- HamWare Advanced Class w/Morse
- HamWare Extra Class w/Morse
- Ham radio *FCC Rules and Regulations, Part 97*
- *Amateur Radio—King of Hobbies*
- An extensive list of Contact Volunteer Examiners

Save by ordering the **NARA Training Package**. This entire package (5¼" and 3½" disks) is only **\$32.95 (\$3.00 S&H)** #S220.



Upgrade To General Class With The NARA Upgrade Package

NARA has put together all the essential tools you'll need to upgrade to General class. This value-packed offer includes:

- *UPGRADE!* book by Donald L. Stoner, W6TNS
- HamWare General Class IBM (5¼" and 3½" disk) testing software w/Morse
- Ham radio *FCC Rules and Regulations, Part 97*
- *Amateur Radio—King of Hobbies*
- An extensive list of Contact Volunteer Examiners

The **NARA Upgrade Package** is available through all major Amateur Radio equipment dealers, or directly from NARA for only **\$29.95 (\$3.00 S&H)** #P240.

A **FREE** issue of *The Amateur Radio Communicator* will be sent to you when you order any product from NARA! Your magazine will be mailed at a later date.

MacHam™—Outstanding Testing Software for The Mac

MacHam is clearly one of the most elegant and useful series of Amateur radio programs ever written for the "Mac." Because of the superb Mac graphics, all required circuit diagrams are displayed with the question right on the screen. If the test is printed, the diagrams are included.

The flexibility for training is excellent. The tests can be taken on screen, by element or by chapter, with options of immediate or end-test scoring. Printouts, of interest to VE's, create exact VE style exams, with pool question numbers, correct answer key and blank answer sheets as desired.

MacHam has a handy on-line glossary of terms. If you don't understand a word, simply look it up!

You'll get quite a surprise when the program loads. Not only is there a picture of a rotary beam, the sound plays the "Fifth Symphony!"

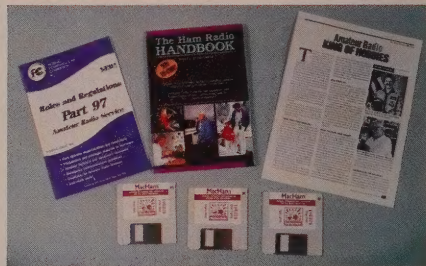
Choose from the following:

- MacHam Novice/Technician Class #S310
- MacHam General Class #S311
- MacHam Advanced Class #S312
- MacHam Extra Class #S313

It's the perfect companion for *The Ham Radio Handbook*. Order your copy from NARA today.

- MacHam Novice/Technician is **\$34.95 (\$2.00 S&H)**.
- MacHam General, Advanced or Extra Class are **\$29.95 (\$2.00 S&H)** each.

System requirements: Any Macintosh computer, Mac Plus or newer, 2MB RAM with hard drive and Mac compatible printer. Fully compatible with System 7.0 and 6.0.7; ships with HyperCard 2.1 on two 3½" 800K disks.



Pass The New Codeless Technician Test With The MacHam™ Education Package

Get everything you need with the **MacHam Education Package**. It includes:

- MacHam Novice/Technician Class Software
- *The Ham Radio Handbook*, by Donald L. Stoner, W6TNS
- Ham radio *FCC Rules and Regulations, Part 97*
- *Amateur Radio—King of Hobbies*
- An extensive list of Contact Volunteer Examiners

Order direct from NARA today. The **MacHam Education Package** only **\$49.95 (\$3.00 S&H)** #P320.

Upgrade to General with The MacHam™ Upgrade Package

This package is what you need if you've decided to upgrade to General Class. The **MacHam Upgrade Package** includes:

- MacHam General Class software
- *UPGRADE!* book by Donald L. Stoner, W6TNS
- Ham radio *FCC Rules and Regulations, Part 97*
- *Amateur Radio—King of Hobbies* (a publication that introduces you to Amateur Radio)
- An extensive list of Contact Volunteer Examiners

Order direct from NARA. The **MacHam Upgrade Package** is only **\$44.95 (\$3.00 S&H)** #P340.

FEATURES

13 CW Is Like A Letter From Home

by Marshall King, N7PIP

14 Outfoxed!

by William F. Blinn, N8POV

DEPARTMENTS

2 In My Opinion

by Don Stoner, W6TNS
Editorial

4 Touch of Class

by Terry R. Dettman, WX7S
Propagation

7 Ham Radio Outlook

by Fred Maia, W5YI
Amateur Radio Call Signs

11 Teaching the Ham Class

by Gordon West, WB6NOA
Teaching Morse Code

ON THE COVER



Our cover photo this month shows a father and son spending quality time together using an Amateur radio. We at the NARA feel strongly about encouraging our young people of today to explore the many wonderful aspects that Amateur radio has to offer—both fun and educational.

Many thanks to ICOM America, Inc., 2380-116th Avenue NE, Bellevue Washington 98004 for permission to use their photo.

The Amateur Radio Communicator

The *Amateur Radio Communicator* is published monthly and is the official journal of the National Amateur Radio Association (NARA), P.O. Box 598, Redmond, WA 98073-0598.

The National Amateur Radio Association is incorporated in the State of Washington and is an exempt organization as defined in Section 501(c)(3) of the Internal Revenue Service Code.

Organization Goals

The National Amateur Radio Association is a nonprofit organization. It consists of individuals interested in the art of radio communication. The broad goal of NARA is to make Amateur Radio more widely known and to encourage more people to become involved in the Amateur Radio Service.

The organization has four specific goals within this broad framework. These are to a) publicize Amateur Radio to the general public, b) attract young people to the Amateur Radio Service, c) help existing Amateurs achieve the greatest benefit from the Amateur Radio Service and d) make Amateurs aware that our radio frequencies are in jeopardy from commercial interests.

NARA advertises in various consumer publications to create a public awareness of the Amateur Radio Service and to encourage readers to write NARA for more information. The Association also solicits authors who write on the subject of Amateur Radio in these publications. NARA has committed itself to making Amateur Radio more interesting and more accessible to all concerned.

NARA is specifically interested in encouraging young people to join our fraternity. The organization works with educators to increase awareness of the Amateur Radio Service and its value as an interesting way of educating young people. A core of young people insures continued growth of the Amateur Radio Service.

NARA believes that existing Amateurs should be more aware of the radio communication theory. Each month an article will appear in *The Amateur Radio Communicator* which discusses a technical aspect of the Amateur Radio Service.

NARA is very concerned that confiscation of frequencies assigned to the Amateur Radio Service will continue. These frequencies are a precious resource. On the other hand, there are an inadequate number of frequencies to accommodate all the new communication requirements. Amateurs must create an environment where it is more beneficial to the public to have Amateur Radio operators on these frequencies than new and emerging commercial services.

Membership and Subscriptions

Those joining NARA receive a subscription to *The Amateur Radio Communicator* for a period of one year. The combined cost of membership and magazine is \$10.00 per year in all areas with a U.S. ZIP code.

The NARA membership and subscription to *The Amateur Radio Communicator* cannot be separated. Since NARA is a nonprofit organization, the membership cost may be tax deductible. Verify this with your accountant.

It is not necessary to hold an Amateur Radio license to become a member of the National Amateur Radio Association. The only "qualification" is an interest in radio communications.

Editorial Policy

Each article and column which appears in *The Amateur Radio Communicator* is evaluated by the Editorial Board to meet a single criteria: how it contributes to NARA's educational objectives. Editorial material is intended to either (1) interest new people in becoming a Radio Amateur, (2) help existing Radio Amateurs get more out of their hobby through better understanding, (3) explain the theory behind some aspect of the service or (4) educate Amateurs on how to retain our valuable spectrum.

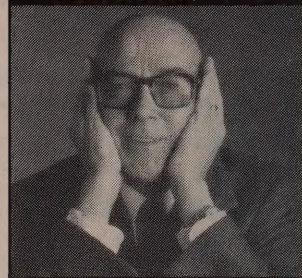
How To Contact NARA

The editors of *The Amateur Radio Communicator* and officers of the National Amateur Radio Association want to hear from you. Please send your questions, comments or submissions to:

National Amateur Radio Association
P.O. Box 598
Redmond, WA 98073-0598
Inquiries: 206-869-8052
Orders only: 1-800-GOT-2-HAM
(1-800-468-2426)
FAX: 206-861-5780.
MCI Mailbox: NARANET3
CompuServe: 76702,753.

 **NARA**
NATIONAL AMATEUR RADIO ASSOCIATION
P.O. Box 598
Redmond, WA 98073-0598

Editor/Publisher Donald L. Stoner, W6TNS
General Manager Bill Everett, K7RIE
National Coordinator Elizabeth Tackett
Marketing George Ure, AC7X
Technical Editor Terry Dettmann, WX7S
News Editor Fred Maia, W5YI
Instruction Editor Gordon West, WB6NOA
Technical Advisor Dan Lewis, N7NQL
Programing Olan Hanley, KB7GIS
Publication Patricia Meeks, KS7L
Finance Lucy Heenan



Here Come The Judges!

by Don Stoner, W6TNS

W

ELL, THE "PC-POLICE" ARE AT IT AGAIN.

Come to think of it, they were making noises last month also. No, I don't mean guys in long overcoats and

sunglasses who check to see if we are using the latest 386 machine. It's not that kind of PC to which I refer.

The Keystone Cops who darken our word processors are those who want to insure the purity of thought and to enforce their ideas of what is politically correct. Most of the time they are unintentionally quite funny—sort of like insisting that we refer to *person-hole* covers instead of *man-hole* covers. Fortunately we don't use many person-hole covers in Amateur radio so I have not belabored the point.

Every so often, we hear from these folks who point out our transgressions when we deviate from the path of "PC-ness." Last month was typical. Somewhere or other, I had referred to the ladies in our hobby. Some fellow wrote and was quite upset with me. (It's always men, by the way, I'm not sure why.)

Anyway, this fellow proceeds to berate me... "they are not ladies... they are women!" he insisted. I guess he had a point. Females today are always women but, sadly, they are not always ladies. His point, taken to the logical conclusion, would be a revision of our traditional references such as XYW's or just YW's. Can

YOU SHOULD
BE AWARE
THAT ELEMENT 2A
AND 3A ARE ABOUT
TO BE REVISED.

you imagine saying "I just got the chow call from the XYW so I gotta go?" Maybe if we had started, years ago, to call them XYF's or XYW's, it would sound just as strange to say XYL's. But, if we did, you can be sure there would be some clown beating on our mailbox, insisting that they were not women—that they were ladies!

The latest episode arrived on my desk last week. Once again, I was bedeviled by a PC-cop (yep, male) for stressing our "fraternity." This was one of the reasons that women were reluctant to become hams, he maintained. Fraternities are for men

only! I guess this chap had visions of John Bulushi in "Animal House" representing the image of a fraternity. I had not even taken the time to look up the word in my trusty dictionary, but I pictured "fraternity" to mean a group of people bonded together by common interests. It just so happens that one dictionary describes the word "fraternity" as "a group of people associated or linked by similar backgrounds, interests, or occupations." And that certainly describes ham radio.

I'm sure the gentlemen meant well. But it served a more important purpose in my mind—that was to point out how we perceive words. I'm as guilty as anyone. I don't like the word "Elmer," as it relates to those who help others join our service. I much prefer "Helping Ham," even though it is an awkward phrase. When I hear the word "Elmer," I get this mental picture of a wimpy clod who talks funny and always loses to a much smarter rabbit. But the League has done such a great job promoting the "Elmer" concept, I'm shoveling sand against the tide to try and eliminate or replace the word "Elmer."

I have another idiosyncrasy, and it is my perception of the word *amateur*. To me it sounds like something less than the best—something less than professional. But I have no more chance of changing that, than I do the word "Elmer." But there is something we at the NARA can do about the word and that is to capitalize it. I'm sure some of you have

noticed that we speak of Amateur and Amateur Radio in capitalized form.

The same idea applies to Volunteer Examiners. These people work very hard to bring new members into the hobby. They contribute evenings and weekends, when they could be with their families, to conduct VE testing sessions. They receive little or no compensation other than for a job well done. The least we can do is capitalize the words "Volunteer Examiner."

The FCC used to speak of Amateurs and Amateur Radio in capitalized form. Then, at the time of the Part 97 rewrite, this was changed. In fact, I recall editing the question pools as a result of the change. In some instances, there was nothing more involved than making the case change in the text. I have no idea why this was done.

So we've elected to capitalize these words in our publications. We're not going to try and ram the idea down everyone else's word processor like the PC-police. But who knows? Maybe they will be adopted over time and this will be my legacy. On my tombstone, let it read he was an Amateur with a capital "A."

HOW ABOUT A DIP IN THE POOLS?

Speaking of the question pools, did you ever wonder where they came from? Most people think they were generated by the Federal Communication Commission. Fred Maia, W5YI, described the origins in an early "Ham Radio Outlook," his regular column in *The Amateur Radio Communicator*.

The question pools actually originate from the Amateurs themselves. A committee of hams decide what questions are suitable to test the knowledge of the applicant. This includes unambiguous and non-controversial wording of the answer and which "distractors" are useful. "Distractors," by the way, are what you and I call the wrong answers.

The committee consists of Ray Adams, N4BAQ, Fred Maia, W5YI, and Bart Jahnke, KB9NM, of the ARRL. But I want to stress that the

origin of the questions is the ham fraternity (there's that word again). You cannot imagine what a difficult job it is nor why it is sometimes necessary to haggle over wording. First, the questions must be technically correct, they must represent something that an Amateur, at a given level, would be expected to know and they must be clear in their meaning.

You should be aware that Element 2 and 3A are about to be revised. Element 2 is the Novice question pool and 3A was for the now obsolete Technician class. The two pools combined become the testing basis for the new "no-code" Technician license class. These two pools will be all new—not just a polished job of the existing questions.

NARA, as well as our members, have an obligation to assist the committee with the question pools. Let's look at a detailed schedule for the revisions. (I want to avoid confusion and rumors that the current questions on the shelves at ham stores are no good, this is not the case.)

The public should begin submitting questions by the time you read this. The acceptance period will close at the end of June, 1992. The finalized questions will be released to the publishers of this material at the beginning of December, 1992. New codeless Technician manuals will be at the ham stores by the beginning of May, 1993. The Volunteer Examiners will begin using the new questions on July 1, 1993.

The questions must be easily understood by young people. Questions

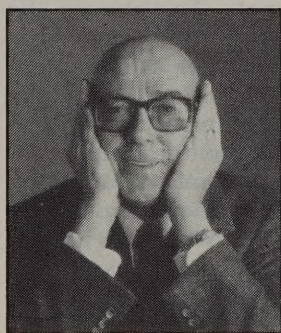
for the Novice test should be aimed at ages 12-13 (school grades 7 and 8). The Technician questions (Element 3A) are directed to high school students in the 14-17 age group (grades 9-12).

*The National Amateur Radio Association encourages you to submit new questions, based on the above guidelines, to us **by May 31, 1992**. We will review them and submit the suitable ones to the Question Pool Committee.*

What's in it for you? There's no way to acknowledge your contribution in the question pool. Once it leaves us, your contribution is combined with hundreds of others. There's no monetary compensation and the only "glory" would come from seeing your question in the finalized pool.

Even though you have a duty to your fellow Amateurs and the prospective newcomers to make a contribution, NARA would still like to say "thank you" for your efforts. So here's the "deal." *Send us one or more new questions by May 31, 1992, note the correct answer and add three suitable "distractors."* In return, we'll send you a copy of the tape recording, *The Flight of OSCAR One*. This cassette recording, made almost 30 years ago at Vandenberg Air Force Base in California, is a classic and marks the beginning of the OSCAR satellite program. Do it today!!! The NARA, the Question Pool Committee, and a generation of new hams will thank you.

73, Don, W6TNS



UPGRADE!

by Donald L. Stoner, W6TNS

Upgrade To General Class With UPGRADE!

NEWCOMERS MAY NOT BE AWARE of the vigorous debates that accompanied the introduction of the Technician license in February 1991. Many hams insisted that this reduction in entry standards would result in the destruction of the Amateur Radio Service.

NARA, one of the leading proponents of a "no-code" license, believed that an entry class of

(Continued on page 16)

Types of Propagation

by Terry R. Dettmann, WX7S

HOW DOES YOUR SIGNAL get from your antenna to the antenna of the amateur you're talking to? That's the subject called *propagation*.

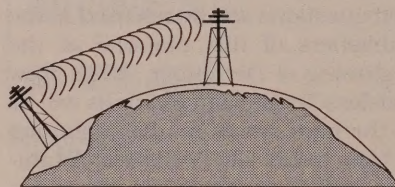
For the Novice examination, there's only one question on this topic. But, you'll find it important, particularly if you're interested in DX operation. As you go for higher licenses, you'll be expected to know more about propagation.

In this installment, we're going to review three basic types of propagation, *line-of-sight*, *ground-wave*, and *sky-wave*. When you're working at VHF or higher frequencies, line-of-sight propagation is the mode you'll need to understand. At HF, ground and sky-wave propagation is usually more important. There are other types of propagation, but these will do for now.

Why should you worry about propagation? After all, once the energy leaves the antenna, there is little that you can do to affect the signal. That's true as far as it goes, but if you don't understand propagation, then you may just be wasting your electricity. Once you understand a little about it, then you'll understand why it's important to you.

LINE-OF-SIGHT PROPAGATION

The simplest and most easily understood way in which a signal travels from one antenna to another is by *line-of-sight propagation*. Line-of-sight propagation requires a path where both antennas are visible to one another and there are no obstructions. VHF and UHF communication typically use this path. Unless you are very close to your destination, you need to keep the antenna as high as possible. Because radio waves follow a straight-line in this mode, they simply go off into space as the curvature of the earth causes

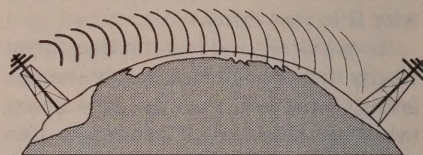


the ground to drop away beneath the radio waves.

As we elevate the antenna, the distance to the horizon gets further and further away. With enough power to reach the other antenna and a high enough antenna to see it, we can talk without problems. VHF repeaters are usually mounted on high buildings or mountain tops for this very reason. When you are operating with a small VHF hand held, your signal must be able to travel in a straight-line to the repeater or your signal will be lost to someone beyond line-of-sight.

GROUND-WAVE PROPAGATION

Ground-wave propagation is not a variation of line-of-sight propagation. In fact, ground-waves will travel further because the curved surface of



the earth pulls the signal down and keeps it along the ground. You can reach an antenna which is below the horizon with ground-wave propagation, one you can't "see" by line-of-sight propagation. But, since the signal interacts with the ground, it loses a lot of energy as it travels, severely limiting its range.

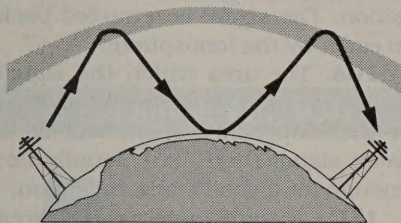
Ground-wave propagation is important for fairly short range communication in the HF bands.

SKY-WAVE PROPAGATION

Do you want to get out of the near neighborhood and reach the rest of the country for a Worked All States (WAS) award? Or maybe you want to talk to the rest of the world for a DXCC certificate. Sooner or later you'll have to use *sky-wave propagation*. In this mode, the signal you send out radiates up towards the ionosphere, 30 to 250 miles above the surface of the earth. Depending on how ionized it is and the frequency you're using, it will act more

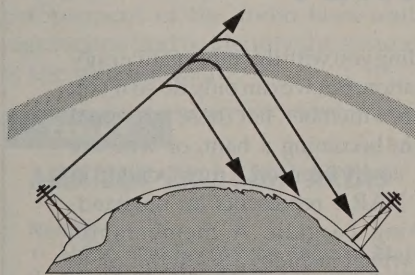
or less like a mirror to reflect your signal back to the earth some distance away.

Your signal will literally skip over a wide section of country and come back down to earth many miles away. At this point, it can be reflected again to bounce a second time (and some times even more) back to earth again. It's like shining a search-light up and having it reflected back to illuminate the ground many miles



from the light. You can only talk to those people in the patch of earth that your antenna is "illuminating" with its signal. The place that the signal skipped over is called the *skip zone*.

What actually happens in the ionosphere is that the signal is bent (or refracted) by the ionosphere. Below the *MUF (Maximum Usable Frequency)*, there is so much bending that the signal emerges from the bottom of the ionosphere pointed back at the ground. It's not really a mirror and it doesn't reflect the signal.



You can picture the ionosphere like a bunch of glass panes stacked on top of one another. As you probably remember from high school physics, light passing through a different medium (like water or glass) is bent. Imagine that as the signal,

arriving at 45 degrees, passes through a layer, it bends over just a little. If it bends 10 degrees every time it enters a pane of glass, then after 9 panes, it will have turned by 90 degrees and will be heading down towards the ground at a 45 degree with respect to the glass panes.

The ionosphere works somewhat similarly. The bending is gradual but increasing as the signal keeps going into the ionosphere until it leaves either at the top going towards outer space (because it wasn't bent enough to come back) or it leaves at the bottom going back to the earth. If it goes out the bottom, then it's a skip signal.

TEST YOUR KNOWLEDGE

OK, let's test what you know. There are twelve possible questions on the Technician test covering the types of propagation we've just discussed. There are some other questions related and only one question of all of these will be chosen for the test. Try them and see how you do.

- What type of radio-wave propagation occurs when the signal travels in a straight-line from the transmitting antenna to the receiving antenna?
 - Line-of-sight propagation
 - Straight-line propagation
 - Knife-edge diffraction
 - Tunnel propagation
- What path do radio waves usually follow from a transmitting antenna to a receiving antenna at VHF and higher frequencies?
 - A bent path through the ionosphere
 - A straight-line
 - A great circle path over either the north or south pole
 - A circular path going either east or west from the transmitter
- What type of propagation involves radio signals that travel along the surface of the Earth?
 - Sky-wave propagation
 - Knife-edge diffraction
 - E-layer propagation
 - Ground-wave propagation
- What is the meaning of the term ground-wave propagation?
 - Signals that travel along seismic fault lines
 - Signals that travel along the surface of the earth
 - Signals that are radiated from a ground-plane antenna
 - Signals that are radiated from a ground station to a satellite
- Two Amateur Radio stations a few miles apart and separated by a low hill blocking their line-of-sight path are communicating on 3.725 MHz. What type of propagation is probably being used?
 - Tropospheric ducting
 - Ground-wave
 - Meteor scatter
 - Sporadic E
- When compared to sky-wave propagation, what is the usual effective range of ground-wave propagation?
 - Much smaller
 - Much greater
 - The same
 - Dependent on the weather
- What type of propagation uses radio signals refracted back to earth by the ionosphere?
 - Sky-wave
 - Earth-moon-earth
 - Ground-wave
 - Tropospheric
- What is the meaning of the term sky-wave propagation?
 - Signals reflected from the moon
 - Signals refracted by the ionosphere
 - Signals refracted by water-dense cloud formations
 - Signals retransmitted by a repeater
- What does the term skip mean?

- A. Signals are reflected from the moon
 - B. Signals are refracted by water-dense cloud formations
 - C. Signals are retransmitted by repeaters
 - D. Signals are refracted by the ionosphere
10. What is the area of weak signals between the ranges of ground-waves and the first hop called?
- A. The skip zone
 - B. The hysteresis zone
 - C. The monitor zone
 - D. The transequatorial zone
11. What is the meaning of the term skip zone?
- A. An area covered by skip propagation
 - B. The area where a satellite comes close to the earth, and skips off the ionosphere
 - C. An area that is too far for ground-wave propagation, but too close for skip propagation
 - D. The area in the atmosphere that causes skip propagation
12. What type of radio wave propagation makes it possible for amateur stations to communicate long distances?

- A. Direct-inductive propagation
- B. Knife-edge diffraction
- C. Ground-wave propagation
- D. Sky-wave propagation

Let's go back over the questions one-by-one and see how you did.

1A. This question sounds like it gives you the answer. If the signal travels in a "straight line," then it must be "straight-line" propagation. Don't be fooled though. The propagation mode is called "line-of-sight!"

2B. VHF and UHF frequencies usually use line-of-sight propagation because of the frequency. It's just too high for the other propagation modes.

3D. In this case, the question does give away the answer: the signal travels "along the surface of the earth" and hence it must be a "ground-wave."

4B. Ground-wave propagation travels along the surface of the earth. Match the two concepts and you'll never be mistaken.

5B. With a low hill blocking the line-of-sight, it clearly isn't "straight-line" and the other modes (which you won't learn about until you go for higher classes of license) are unlikely at 3.735 Mhz (on the Amateur 80-meter band). Ground-wave is the only choice left.

6A. Remember that ground-waves interact with the ground, thereby losing energy. This limits the range of the ground-wave compared to a sky-wave. So the range is "much smaller."

7A. The ionosphere refracts the signals back to the ground in sky-wave propagation.

8B. Sky-wave propagation uses the ionosphere to turn the signals back to earth (it refracts them).

9D. Skip propagation is simply another name for sky-wave propagation. The signal is refracted back to earth by the ionosphere.

10A. The area which the signal jumps over in sky-wave propagation is the skip zone. There will be a weak signal there, but usually not enough for a good communication.

11C. A skip zone is the area jumped or skipped over by your signal on its way up to and back from the ionosphere.

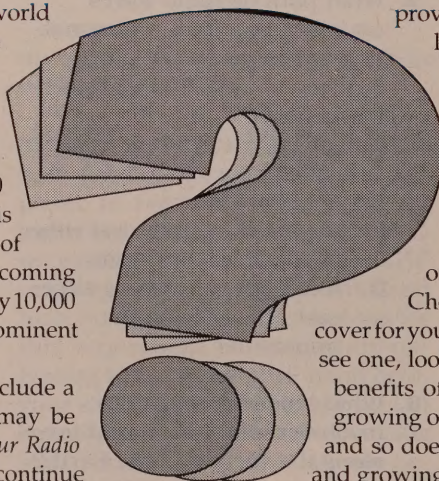
12D. How far do you want to get? Very close, you'll use straight-line. Over the horizon, you'll use ground-wave. But if you want your DXCC or WAS, you'll have to use sky-wave propagation.

You've done well this time, haven't you? Basic propagation modes at the beginners level aren't hard. In fact, they're pretty simple once you learn a few terms. □

HOW DID I GET THIS MAGAZINE?

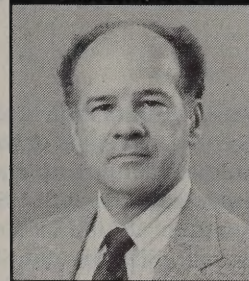
One of the ways we can tell the world about the goals and ambitions of the National Amateur Radio Association is to supply complimentary copies to non-Amateurs. We send copies of each issue to hobby shops and science centers, and about 6,000 pieces to newly licensed hams. This magazine is also mailed to a select list of people who might be interested in becoming Amateurs. We also send approximately 10,000 copies to NARA members and prominent people in Amateur Radio.

If your mailing label does not include a NARA membership number, this may be your last or only copy of *The Amateur Radio Communicator*. We would like to continue



providing you with this informative publication, but we can only do so if you are a member. For those interested in becoming a ham, or who are newly licensed, a membership in NARA represents an outstanding bargain. A membership, which includes a subscription to *The Amateur Radio Communicator*, is only \$10.00 per year.

Check the mailing label on the back cover for your membership number. If you don't see one, look up about six inches and read the benefits of becoming a member of this fast-growing organization. We need your support and so does ham radio. Help us get it "going and growing!"



National Volunteer
Examiner Coordinator

Amateur Radio Call Signs

Everything you ever wanted to know, but were afraid to ask!

by Frederick O. Maia, W5YI

AMATEUR RADIO CALL SIGNS date back to the early 1900's when the government decided they would assume control of the radio spectrum. Before World War I, anybody could transmit on any frequency and with any amount of power. There weren't any radio laws and no call signs. Morse code and spark transmitters dominated the airwaves and pandemonium ruled!

Call signs are defined as a series of government-assigned letters—or letters and numbers, which identify a transmitting station. That is the only purpose of a call sign—to aid enforcement of the radio laws and regulations and to identify the source of the transmission.

The earliest Amateur Radio call letters started with a number rather than a letter. Hiram Percy Maxim's original call sign was 1AW not W1AW. The many nations, that make up the International Telecommunication Union (ITU), developed a system of country prefixes before World War II. This was done to identify communications of other nations. The ITU is the United Nations agency that was formed in 1865 to facilitate the transmission of wireline telegrams across international borders. Just about every country in the world is now an ITU member.

The first characters of a call sign in every radio service indicates the country in which the station is authorized to operate. The United States is assigned prefix letters AAA-ALZ, KAA-KZZ, NAA-NZZ and WAA-WZZ. Every radio station, whether it be broadcast, aeronautical, marine, business band, military, public safety—whatever—is usually given a

call sign beginning with one or more of these prefix letters. An exception is CB radio stations. Because of its theoretical local range and millions of potential participants, CB'ers are no longer assigned unique call letters. They operate under a "blanket authorization" without call signs.

Amateur call signs historically have been assigned one or two-prefix letters beginning with AA-AL, NA-NZ, KA-KZ or WA-WZ followed by a geographical designator and then one to three more alphabet letters. The continental United States is divided into ten call areas, zero through nine. The character "Ø" is read zero and has a slant bar through it to distinguish it from the letter "O." The number signifies the radio district (see Table Number 1).

The FCC first began assigning Amateur call signs from the "W" and "K" prefix blocks with two or three-suffix letters after the regional designator. Novices were assigned a prefix with the second letter "N" to denote their license class. For example, WN6AAA was an early Novice call sign in California. When the Amateur upgraded, the "N" was dropped from the call sign and it became W6AAA. The FCC began dispensing Amateur calls beginning with "WA," "WB" and "WD" prefixes when they ran out of "W" and "K" prefixes. When an Amateur moved from one district to another, he had to change his call sign to coincide.

Back in the fifties and sixties it was not unusual for the FCC to re-

TABLE 1

AMATEUR CALL SIGN AREAS

Number	Areas
1	Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut
2	New York, New Jersey, U.S. Virgin Islands
3	Pennsylvania, Delaware, Maryland, District of Columbia
4	Virginia, North and South Carolina, Georgia, Florida, Alabama, Tennessee, Kentucky, and Puerto Rico
5	Mississippi, Louisiana, Arkansas, Oklahoma, Texas, New Mexico
6	California, Hawaii
7	Oregon, Washington, Idaho, Montana, Wyoming, Arizona, Nevada, Utah, Alaska
8	Michigan, Ohio, West Virginia
9	Wisconsin, Illinois, Indiana
Ø	Colorado, Nebraska, North and South Dakota, Kansas, Minnesota, Iowa, Missouri

ward certain individuals with preferential call signs or to assign desirable call letter sequences to certain organizations. W3USS became the Amateur station located in the U.S. Senate. W2USA and K2USA went to U.S. Army stations located at Ft. Lewis, Washington, and Ft. Monmouth, New Jersey. K3USN is the U.S. Navy Communications Center at Runnemede, New Jersey. NN3SI is the Smithsonian Institution's Amateur station located at the National Museum of American History. There are hundreds of others.

There was a time when, for \$25.00, an Extra Class Amateur could purchase a preferential call sign of choice from the government. Later on, in the mid 1970s, the FCC allowed holders of the highest-class license to choose any call sign not held by another Amateur. That is how I got the call sign W5YI; I was W5UTT at the time. My first call sign, more than thirty-five years ago, was W1NTK. I obtained my ticket while going through radio school at Keesler Field in the U.S. Air Force. My home-mailing address was Brockton, Massachusetts, so I was issued a "1" call. I was a ham before I knew what ham radio was! I can remember the instructor asking who wanted a ticket and I didn't want to be left out.

There was a huge government scandal in the 1970s when some Amateurs noticed that certain distinct call signs were being issued by the FCC to individuals. An official in charge of the FCC's Gettysburg licensing facility ultimately got sentenced to prison for accepting \$100 payoffs sent by Amateurs who wanted particular call letters to his

private post office box. This situation, plus the fact that it was getting increasingly expensive to manually-handle call sign assignment, led the FCC in 1978 to adopt their present automated-call sign assignment system.

COMPUTER-AIDED CALL SIGN ASSIGNMENT

The new system allowed Amateurs to obtain shorter—and theoretically more desirable call signs—in exchange for upgrading their license. Sort of incentive licensing all over again—with the prize being a better call sign. Also victims of the budget-cutting axe were the issuance of new clubs and RACES (Radio Amateur Civil Emergency Station), military-recreation call signs, short-term special events stations and secondary call signs.

Amateurs were particularly disappointed at losing their right to special and secondary call signs. The FCC said it was simply too expensive to maintain a system of additional call signs for a single Amateur. It added that "...operation of an Amateur station at a special event could be conducted just as easily under the authority of an ordinary Amateur license because the average member of the public could not possibly distinguish a special-event call sign from a typical-Amateur call sign or understand the significance of a special-event call." While this is no doubt true, the fact remains that most countries of the world do in-

deed assign special call letters to commemorate specific events. The suffix letters usually are the initials of the event.

Secondary call signs used to be optionally assigned to additional stations at other than the primary location of the Amateur but not anymore. The FCC also eliminated their policy of requiring a licensee moving from one call sign region to another, to apply for a new call sign with the appropriate regional designator.

The FCC began assigning Amateurs living outside the continental U.S. in the Pacific area with distinctive "KH" prefixes; "KP" went to the Caribbean, "KL" to Alaska. While the Commission originally was to issue special (2-by-3) call signs with the prefix "WM" to military recreation, "WC" to civil-defense "RACES" stations, "WR" to repeater and "WT" to temporary stations, they never followed through.

Under the rules now in effect, any Amateur may request a call sign change appropriate for their license class by simply submitting a Form 610 Application. The call sign will carry the radio district designator of the mailing address, even if it is a post office box in a state where the licensee does not reside. There is no requirement that an Amateur live at his mailing address or operate his equipment from his station address.

A call sign is never changed unless the licensee specifically requests the change. Amateurs are not allowed to request a specific call sign.

TABLE 2

CALL SIGN GROUP OPERATOR

Class

- A Amateur Extra
- B Advanced
- C General/Technician
- D Novice

TABLE 3

AMATEUR CALL SIGN FORMATS CONTIGUOUS USA

(Regions 0 through 9)

Group	Format	Prefix	Issued to
A	1-by-2	K, N, W	Extra Class
	2-by-1	AA-AL, KA-KZ, NA-NZ, WA-WZ	Extra Class
	2-by-2	AA-AL	Extra Class
B	2-by-2	KA-KZ, NA-NZ, WA-WZ	Advanced
C	1-by-3	N	Tech/General
D	2-by-3	KA-KZ, WA-WZ (Except WC, WK, WM, WR, WT)	Novice

The FCC also has a policy of not recovering and reassigning call signs no longer in use.

The new system, officially known as Docket 21135, established four-different call sign groups. When all call signs within a group have been assigned, the next assignment is made from the next lower group (see Table Number 2).

Within each group are a series of consecutively assigned call sign prefix blocks. These are listed in Table Number 3.

Note: A 2-by-3-format call has two prefix letters, a call sign area number (see Table Number 1) plus three suffix letters. Only the "N"-by-3 letters will be assigned to Group "C." Unassigned "K"- and "W"-by-3 letters will not be recovered and re-assigned. When all call signs have been allocated from a group, call signs from the next lower group are

assigned. An Amateur station is not required to change their call sign when they upgrade to a higher class.

COMMONLY ASKED QUESTIONS ON CALL SIGNS

Q How do I change my call sign?

A This may only be accomplished by checking line number 2E on an FCC Form 610 Application for an Amateur Radio Station and/or Operator License.

Q When may I change my call sign?

A You may change your call sign to a new group when you upgrade your Amateur Radio operator license. Novices upgrading to Technician may request a Group "C" (1-by-3) format. Technician's upgrading to General may request a new Group "C" call sign

but they will receive a more recent Group "C" call if they already hold one. Newly upgraded Advanced and Extra Class Amateurs may request new Group "B" and "A" call sign formats. You may change your call sign within your present group any time you wish by submitting a Form 610 application. Once changed, however, you may not revert back to a previously held call sign.

Q When am I required to change my call sign?

A Amateurs are *never* required to change their call sign, even if they move out of the contiguous United States. FCC licensees residing in foreign countries must show a U.S. mailing address on their applications.

Q How may I get a specific call sign?

A At present, the FCC has no procedure for re-issuing call signs no longer held by Amateurs or for assigning any special call sign for any reason. This may change, however. The FCC (and Congress) is considering allowing call sign coordinators in the private sector to assign specific call signs and maintain data bases of these call signs for the Commission. The key word is "considering". This does not mean it will happen.

Q How may I find out what call sign will I be issued?

A Many publications (including the W5YI Report newsletter which I edit) list all call signs issued as of the first of the month. Since all call signs are issued in strict order, you can get an idea of which call signs will be issued in the near future. The list looks like the one in Table 4.

Q How may I get a call sign to operate in a foreign country?

A You must apply to the licensing authority of the country you are visiting. Many countries recognize the testing/licensing process of the United States and will grant you a reciprocal Amateur permit to operate your equipment temporarily in

TABLE 3B

AMATEUR CALL SIGN FORMATS, OUTSIDE OF CONTIGUOUS USA

(US Regions 11 through 13)

Region 11	Alaska Region
Region 12	Caribbean Area Region
Region 13	Pacific Region

Group A, 2-by-1, Extra Class

Region 11	Prefix AL, KL, NL or WL and one-letter suffix
Region 12	Prefix KP, NP, or WP and one-letter suffix
Region 13	Prefix AH, KH, NH or WH and one-letter suffix

Group B, 2-by-2, Advanced Class

Region 11	Prefix AL and two-letter suffix
Region 12	Prefix KP and two-letter suffix
Region 13	Prefix AH and two-letter suffix

Group C, 2-by-2, General/Technician

Region 11	Prefix KL, NL or WL and two-letter suffix
Region 12	Prefix NP, or WP and two-letter suffix
Region 13	Prefix KH, NH or WH and two-letter suffix

Group D, 2-by-2, Novice Class

Region 11	Prefix KL or WL and three-letter suffix
Region 12	Prefix KP or WP and three-letter suffix
Region 13	Prefix KH or WH and three-letter suffix

Amateur stations located outside the continental United States have two-letter prefixes with L, P or H as the second letter; first letter is A, K, N or W.

their nation. Some countries will assign you your own call sign using the ITU prefix of their country. Others will allow you to use your own U.S. call sign with their foreign prefix in front of your call. My assigned call sign was VP9/W5YI when I was in Bermuda on vacation last summer. The "/" is spoken as "stroke" when operating in the voice mode.

Q What call sign do I use in Canada?

A There are special rules for U.S. Amateurs visiting Canada. Canada is the only country that allows U.S. citizens to operate Amateur radio in their country without applying for a reciprocal permit. You simply carry your U.S. Amateur license with you and append the Canadian prefix and

radio district after (rather than before) your call sign. For example, if I was operating in Montreal, my call sign would be W5YI/VE2.

Q I have just upgraded and do not yet have my new license. What call sign do I use on the air?

A The FCC authorizes Amateurs who have already received their first license to immediately use their new privileges on the air when they upgrade. You must identify your call sign with a special identifier whenever operating outside the privileges of the license currently in your possession. This notifies those listening (including FCC-monitoring stations) that you have recently upgraded and are authorized on new spectrum. Novices upgrading to Technician should append their call sign with the letters "KT." For example: KB5AAA would add "temporary KT" to his/her call sign. You would use a slant bar when operating using Morse code. New General Class Amateurs append their call signs with "AG", Advanced "AA" and Extra Class "AE." □

*Fred Maia, W5YI
National Volunteer Examiner Coordinator
P.O. Box 565101
Dallas, Texas 75356*

TABLE 4

AMATEUR RADIO CALL SIGNS

Issued as of January 1, 1992

Radio District	Group A Extra	Group B Advanced	Group C Gen/Tech	Group D Novice
Ø (*)	AAØGU	KFØWA	NØQKP	KAØJUH
1	WZ1V	KD1GB	N1KW	KA1ZOV
2 (*)	AA2HQ	KF2FZ	N2OYD	KB2DAN
3	WU3L	KE3AQ	N3LFS	KA3ZQX
4 (*)	AC4MM	KO4OV	(***)	KD4IMJ
5 (*)	AB5DM	KI5WT	N5YDF	KB5QXA
6 (*)	AB6IB	KM6NP	(***)	KD6EKR
7 (*)	AA7MH	KG7KR	N7VOX	KB7OMS
8 (*)	AA8FT	KF8RJ	N8RKT	KB8NJY
9	AA9CR	KF9HG	K9NRH	KB9HKS
N. Mariana Is.	AHØK	AHØAI	KHØAR	WHØAAQ
Guam	KH2X	AH2CN	KH2FR	WH2AMW
Johnston Is.	AH3D	AH3AD	KH3AG	WH3AAG
Midway Is.		AH4AA	KH4AG	WH4AAH
Hawaii	(**)	AH6LS	WH6EA	WH6COU
Kure Is.			KH7AA	
Amer. Samoa	AH8D	AH8AE	KH8AI	WH8ABA
Wake W. Peale	AH9B	AH9AD	KH9AE	WH9AAH
Alaska	(**)	AL7NV	WL7BA	WL7CDI
Virgin Is.	NP2T	KP2BZ	NP2FE	WP2AHL
Puerto Rico	(**)	KP4TD	(***)	WP4KVA

Call Sign Watch

*=All (2-by-1) "W"-prefixed call signs have been assigned in every radio district except the 1st and 3rd call sign area. 2-by-2-format call signs from the AA-AK block are assigned to Extra Class Amateurs when 2-by-1's run out! (AL prefixes are assigned to Alaska. AM-AZ prefixes are ITU allocated to other countries.)

**=All Group "A" (2-by-1-format) call signs have been assigned in Hawaii, Alaska and Puerto Rico. Group "B" (2-by-2-format) call signs are assigned to Extra Class Amateurs when Group "A" is depleted.

***=Group "C" (primarily 1-by-3) call signs have now run out in the 4th, 6th and Puerto Rico call districts. According to

the rules (adopted by the Commission February 8, 1978, Docket No. 21135), Technician/General class Amateurs are next assigned Group "D" (2-by-3-format) call signs when all Group "C" have been assigned. Upgrading Novices holding a (2-by-3-format) call sign in the 4th, 6th and Puerto Rico call areas will no longer be able to request a Group "C" call and will be automatically assigned another more recent (2-by-3-format) call sign if they do!

Contrary to the wishes of many Amateurs, the FCC has said they will not be going back and reassigning unused "K" and "W" (1-by-3-format) call signs.

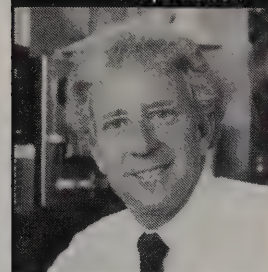
[Source: FCC Licensing Facility, Gettysburg, Pennsylvania]

THE W5YI-VEC

The W5YI-VEC is a very large organization of Amateur Radio operators who periodically conduct ham license examinations in most large cities across the country. The W5YI Group also distributes most commercially available license study material; both for the Morse code and written tests. They may be reached at 1-800-669-9594 during regular business hours.

The W5YI-VEC is always on the lookout for Advanced and Extra Class level Amateurs who would like to assist the ham radio hobby grow by conducting periodic license examinations. Let us know if you are an Advanced or Extra Class level Amateur and wish to participate in our testing program. You may request a VE application by writing:

W5YI-VEC
P.O. Box 565101
Dallas, Texas 75356



Teaching Morse Code

by Gordon West, WB6NOA

M

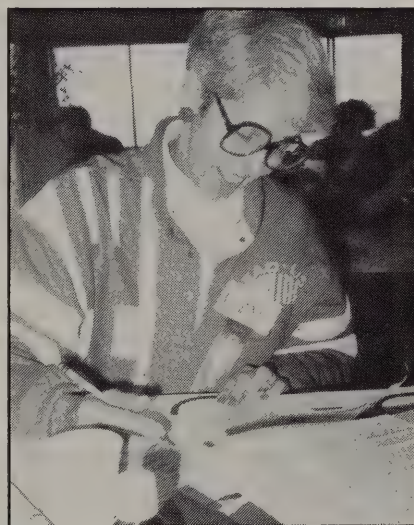
ANY OF YOUR NO-CODE TECHNICIAN STUDENTS want to pursue the Morse Code after they get the Novice and Technician Class written exam out of the

way. It makes good sense to plan a series of code classes right after you graduate your no-code Techs. Get them fresh out of no-code Tech school and they're motivated to earn additional HF privileges by learning a few dots and dashes at 5 wpm.

A General code class is also popular because it opens up all the worldwide bands to Novice, Technician and Technician-Plus operators. I can't think of any Technician operator who would want to turn down HF phone privileges if it were offered, for simply upgrading code privileges.

And the same thing applies for Extra class, so target those Advanced class operators you know. Get them thinking about the joy of having made it to the top, plus becoming a Volunteer Examiner, as well as never having to worry about upgrading again.

Students who love the code, or have had previous code experience in the military, probably won't take your class. They play code over their transceivers on the air, and this is the very best way to increase code speed and comprehension. Nothing beats on-the-air code work. Forget



This student takes a minute to clean up her code copy.

about trying to get those students into your class—they don't need one.

Your Morse Code class is targeted to those students who may just wish to learn the code to pass the test, and then get on with their HF-voice operating fun. These students make no bones about it—"just teach me to pass the test, and if I like the code at a later date, I'll use it. But for right

now, just get me through the test." Sound familiar?

So, to get your students through the test, you must work with them. Prepare the students for the type of code test that will soon be administered. Increase their code-copying capabilities and increase their code-copying speed. That's right, get them tuned into what's going to happen at the VE test table.

This is where *you* will need to do your homework. Locate a Volunteer Examination team that will test your students. Hopefully, the team will come to your class and test with the same headphones, the same electronic keyers, the same everything that you have been using over the past few days or weeks or months to train your students. I have seen countless students "bomb-out" of a code test because the examiners came in with a small tape player that didn't sound anything like the code-practice oscillator the students were regularly using in class. Most VE teams have some excellent equipment for sending the code tests. But I still hear stories about doorbell buzzers, lousy tape players, and erratic straight-key sending that the students had not planned on.

If your examiners are going to test your students with a doorbell, better use a doorbell for the last few weeks of code-test practice!

It's also important for you to find out what character rate, and what tone, your examiners will use to send the test. The FCC guidelines are quite clear—5- and 13-CW tests should be generated at 15-wpm character



Students turn in the code copy to the VE Team for corrections and grading.

rate, spaced to 5- or 13-wpm-word rate. For the 20-wpm test, 21-wpm character rate is used. Audio tone may vary between 700 to 1,000 hertz [reference: FCC Information Bulletin dated June 22].

It's also important to insure your students will be given a typical QSO similar to what you have been preparing them for. If they anticipate a QSO, but get random, all heck is going to break loose in the test room. Do your homework and find out ahead of time character rate, tone, and examination type the Volunteer Examiners will use for testing your students.

Volunteer Examiners do not have to tell you what's going to be coming down the earphones or speaker jack. They might want to keep it a secret. That's okay, you might want to find a different Volunteer Examination team to invite over for the CW examination process.

That's right, pick a team that you can work with—and pick a team that will parallel your type of teaching techniques for CW as outlined by the FCC guidelines. But find out ahead of time some of the ground rules—will the QSO test begin with call letters, or will it begin in the middle of a QSO? Will it be plain language, or filled with abbreviations?

Can your students also turn in one minute of perfect copy for pass-

ing the test? Is that one minute of perfect copy straight out of the pen, or can they go back and make corrections after the test is over?

Is the CW test multiple-choice, fill-in-the-blanks, or a combination of both? Is the character rate for the Novice and General-code test 15 wpm, or the ARRL-18 wpm, or Mr. Navy-telegrapher 25-wpm character rate, spaced to 5 or 13 wpm?

I am holding a letter from an instructor who claims his class of 26 all failed the General-class code test after 16 consecutive weeks of practice. The examiner came in on a hand key at 30-wpm character rate, and spaced out his rapid-fire dits and dahs down to 13-wpm word rate. "It blew us away," comments Tom Hayes, one of the examinees who was regularly copying the ARRL on-the-air 20-wpm code practice with 95 percent copy. "He thought it was real funny when we all bombed."

But in your examination investigation, don't overstep your bounds. *Do not teach the actual test.* Make sure you have absolutely no clue as to the exact content of the exam. If you start teaching exactly what is going to be sent on the test, you and your examiners will some day be audited by a student "OO" (Official Observer), and you'll all be off the air for good.

So do your homework, and find out what's going to happen down the earphones for your CW test-takers. Request that your examiners follow the FCC guidelines for the

generation of an Amateur Radio-CW examination.

There is really no excuse for poor sending during VE tests. Anyone with an IBM computer and tape recorder can generate perfect tests. There is notable software for testing your students. Programs like Morse Academy, generate perfectly formed dits and dahs with Farnsworth spacing (a character speed higher than the sending speed.) Even the Morse program, included in the NARA HamWare™ programs, uses Farnsworth spacing. For more information regarding the NARA HamWare or Morse Academy software contact the National Amateur Radio Association at 1-800-468-2426 or write to PO Box 598, Redmond, Washington 98073.

And for the Volunteer Examiners reading this column, *we* appreciate all of your efforts in conducting Volunteer Examinations to our classroom students. It is this volunteer effort of providing CW and written examinations that is helping the Amateur Radio Service grow. I hope we can all support our local VE testing team, as well as our Regional Volunteer Examination Coordinator. Teach your students the value of this unique service provided by hams for new hams to upgrade.

73, WB6NOA

□

CQ ALL SCHOOLS ON THE AIR

Every Tuesday and Thursday morning, at approximately 1800 hours UTC, Carole Perry, WB2MGP, and Gordon West, WB6NOA, go on the air with the 10-meter CQ ALL SCHOOLS net at 28.303 MHz. If you are teaching a day class, or teaching in the school systems be sure to tune in. Join Carole and Gordo for a lively classroom-to-classroom contact. Prepare to QSY up the band as soon as you make contact with another classroom on the air.

CW Is Like A Letter From Home!

Or—Motivation Is What You Make It

by Marshall King, N7PIP

A

QUESTION OFTEN POSED BY THE beginner, is usually asked with something approaching anxiety: "Do I have to learn Morse code?"

The answer is no, but sometime soon you'll probably want to, for reasons explained below. Meanwhile, you probably already know that the five classes of licenses, starting with the beginning license, are: *Novice*, *Technician*, *General*, *Advanced* and *Extra*. Until recently you couldn't take the test for any license without passing everyone before it. Furthermore, the code speed required for these five licenses were 5 wpm for Novice and Technician, 13 wpm for General and Advanced, and 20 wpm for the Extra class.

As of February, 1991 however, it was no longer mandatory to take a code test in order to get a ham license. The Technician license can now be either a "code" or "no-code" license, with different operating privileges for each. If the beginner wants to go for the "no-code" license, he or she can skip the Novice class (which requires receiving code at 5 wpm) and go straight to the Technician license, which requires no code. This does limit you to frequencies above 30 MHz. Of course, one can at any time, take the 5-wpm code test and earn the "Tech Plus" license which has operating privileges below 30 MHz as well.

All this aside, it is worth noting that you'll likely want to learn code sooner or later, for two very good reasons. First and foremost, signals sent with CW (code) will sometimes

cut through the airwaves where voice and other modes will not. Obviously, this is important when you're going for distance. Equally important, *code is just plain fun*. Once you get into it, it becomes a part of you; the way you handle the key becomes your personal signature. Just as excellent handwriting is a joy to behold, the good sending of CW is a skill easily developed and appreciated by all who hear it. More than one listener has said, "He doesn't have to send his call sign. I can tell who it is just by his hand."

To those who claim that there are those who just can't learn code, let me tell you of an instance that proves otherwise. In the Marine Corps, 30 of us in a radio-operator school were supposed to learn to send and receive 5 wpm in five days. Some of us were goofing off, claiming we could never do it in five days, perhaps not in a hundred and five days. Our instructor, a sergeant named Red Nation, knew otherwise, and he proved it.

On Monday he wanted us to do 1 wpm, and we couldn't. On Tuesday he expected 2 wpm, and we didn't. On Wednesday he said, "All right, boys, maybe I've been too hard on you. Why don't we take a break and have a cigarette while I hold mail call?"

This was good news, for letters from home meant either money, food, or sweet words surrounded by the smell of perfume. With a huge stack of mail in front of him, Sgt. Nation said, "Okay, when I call your name come up and get it."

With that he looked at the name on the first envelope, and promptly sent it out in Morse code, at about 5 words per minute. He held the enve-

lope in the air and asked, "Is this man here?" Instead of receiving an answer, he was met with the sight of thirty jaws hanging open, as we slowly realized our predicament. Sgt. Nation smiled slowly and said, "Okay, I guess he's not here. So we'll go on to the next one."

As something between frustration and panic coursed through our veins, he went through one letter at a time without one of them being claimed. At last he said, "Didn't realize so many people were absent. We'll try again tomorrow."

Did we go on liberty that night and take the town of San Diego apart? Absolutely not. We each sat up memorizing how our names sounded in Morse code. For me the name King was easy, but others like Stephanovich and Van der Werfhorst got no sleep at all. We came to class next day, Wednesday, bleary eyed but determined.

Soon it was time for mail call. Sgt. Nation picked up the first envelope, studied it for a moment, placed his hand on the key, and promptly tapped out the return address from the upper left-hand corner of the envelope. And the characters weren't all from the alphabet; many were numbers.

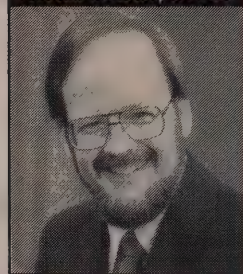
For the second day in a row we didn't get money, fudge brownies or love. By now we knew he wasn't kidding when he said we'd know 5 wpm by Friday. After another night of no sleep we came to class Thursday with about a 75% success rate, and by Friday every single letter was claimed. At last we had the code nailed at 5 wpm. Absolutely solid. Numbers, too, as well as the punctuation. I believe the operative word with Sgt. Nation was "motivation."

That was what I call "brute-force" learning, and while it wasn't very sophisticated, it worked. Today we've got it much easier with new methods for learning with cassette tapes and computer software. You say you're one of those who can't learn code? Don't believe it. Of course you don't have to learn code to get on the air, but sooner or later you'll

(Continued on page 16)



William F. Blinn, N8POV



OUTFOXED!

by Bill Blinn, N8POV

SIGNAL STRENGTH WAS INCREASING quickly as Mike pulled into the shopping mall's parking lot. Suddenly it was clear where the fox was—a van sporting a large two-meter beam antenna was directly ahead. The antenna was aimed in an odd direction, apparently to confuse the fox hunters.

"Ha!" thought Mike, "I'm first!" That was confirmed as he walked toward the van. Hanging from a small peg on the back were numbers that would allow hunters to prove who got there first. The number "1" was clearly visible. But as Mike walked back toward his car, prize in hand, he read the small print at the bottom.

"Decoy," it said. "Number-one decoy."

Mike watched with dismay as another Amateur drove past him, past the van with the big antenna, and then pull up beside a small car with no visible antenna parked several-hundred yards away. The other ham got out of his car and removed what appeared to be a small tag from the back of the car.

Fox hunting (also called bunny hunting, transmitter hunting, and T-hunting in various parts of the country) can be fun. It can also be, as Mike found out, frustrating.

There are two kinds of bunny hunters, says Arthur Burns, KA4WDK, of Holly Hill, Florida, "those who use their equipment and those who use sleuthing capabilities."



Photos by Joe Moell, K0OV

Most T-hunts in the USA involve cars, trucks and vans. At the starting point of this hunt in Albuquerque, New Mexico, the competitors are all using rotatable yagis and quads.

Burns belongs to a club in Florida that has regular bunny hunts. In one, the bunny dressed as a bag lady, complete with a shopping basket that hid the transmitter. Co-conspirators sat across the street in a van and video taped the results.

* Some kids on bicycles decided he was "the ugliest lady" they'd ever seen.

* Two police officers on foot patrol walked away looking perplexed when he covertly showed them the microphone so they wouldn't "blow his cover" while he was transmitting.

Fox hunting is a kind of high-tech hide and seek. One ham uses guise, deceit, treachery, and radio knowledge to make a transmitter hard to find. Then he waits for other club members to find him. To sur-

vive, a clever fox must adapt to the surroundings.

In rural Colby, Kansas, a ham attached a mag-mount antenna to some elevated railroad tracks on an unused spur. Mike Albers, KFØMJ, says "The signal followed the tracks," and the person who found the fox did so only because he spotted something that didn't look quite right.

Albers, who's the city's superintendent of public works, once put a mag-mount antenna on a brand-new trash dumpster and hid inside.

On the other hand, Dave Reason, NØPDL, past President of the Wichita Amateur Radio Club, hid by not hiding. Reason donned a wig, tucked an HT under an army jacket, and hid a beam antenna in a bush. Then he lay in a city park and pretended to be listening to a boom box. Reason's headphones were connected to the HT though, and three fox hunters carefully inspected him closely before one finally announced, "OK, Dave, Halloween's over."



(Left) Foxhunters can be fierce competitors, but they always remain friendly and cooperative. At this international event in Portland, Oregon, last-minute RDF set repairs are made by Soviet ham magazine editor Gene Shulgin, UZ3AU, under the watchful eye of radiosports participant Dima Ornatsky (a soon-to-be Russian ham) and Japanese foxhunting champion Yoshiko Yamagami, JQ1LCW.



(Bottom) Young people are fascinated by foxhunting, and it whets their appetite for more knowledge of radio. These students at the Youth Science Center at Fullerton, California, are getting ready to find the "fox" under guidance of Christie Holoubek, K0IU.

In Denver, an Amateur hid the transmitter near an airport in an area with only one access road. Hunters zeroing in on the fox were temporarily stymied when they figured out where the fox was, but couldn't cross the airfield to get to the transmitter. Another Denver fox added some white noise to the signal, thus making it virtually impossible to find the null by ear.

Amateurs who have participated in fox hunts say it's a great way to get family members and friends who aren't yet hams involved in Amateur radio. Reason says several non-hams regularly come along to watch the fox hunts in Wichita and then gather with the group later for pizza and "war stories."

Albers says the club in Kansas is growing because, members have done a "pretty fair job getting people

interested in ham radio with fox hunts and then getting them licensed." The club in Colby is small, but pulls members from about 10 counties—including some from east-central Colorado.

In Florida, bunny hunting is "a family thing," according to Burns, who is also a member of City Council. Hunts are limited to an hour or so, and are followed by a party or a picnic where "everyone tells bunny stories like fish stories, 'We were this close'"

Half the fun for the fox may be trying to find a clever way to hide and then finding a plausible explanation for what may appear (to normal people) to be rather odd behavior.

Rules vary from area to area, and from time to time. Some clubs occasionally sponsor a fox hunt with no

rules. The fox may change power or location, just as someone causing intentional interference might. Most often though, the fox has to stay put once the hunt starts and isn't permitted to change power or antenna.

And the skills fox hunters learn can be put to good use. Dave Reason recently used his fox-hunt expertise to track down a stuck carrier on a packet frequency. It took about 50 minutes from the time Reason noticed the signal until he found and silenced the transmitter.

Fox hunting doesn't have to be expensive either. Some hams buy or build complex RDF antennas and specialized receivers, but others make do with everyday stuff.

Dale Rothert, KA8KOD, of Cadiz, Ohio, uses a plain HT. "Walk or drive a bit and if the signal gets weaker, reverse course," says Rothert. When he gets close enough to the fox that he can no longer get a null, he pulls off the antenna and repeats the process. "When I can no longer get a null, I know I'm very close to the fox."

Reason takes the process slightly further. When he gets so close that he can't find a null even without an antenna, he connects a "shorted duck"—a BNC connector with the antenna lead soldered to the shield. He uses a "body-fade" process (holding the HT close to his chest and slowly turning to find the null) with



this setup and when he can no longer get a null with that, he pulls out a field-strength meter and follows it directly to the fox. In fifteen fox hunts over the past two years, Reason has been "skunked" only twice.

Hidden-transmitter hunting is more popular in some parts of Europe—with a particularly high interest in Asia—than it is here. It is growing tremendously in popularity here however, as more Amateurs try it and then tell others how much fun it is.

In Phoenix, there's an Explorer Scout troop that's helped youngsters get involved in Amateur radio and several other groups of Explorer Scouts usually join in on the fox hunts there.

Joe Moell, KØOV, has literally "written the book" on transmitter hunting. (Moell's book *Transmitter Hunting: Radio Direction Finding Simplified*, co-authored with Thomas Curlee, WB6UZZ, is a favorite reference for fox hunters.) Moell and his wife, April, are on the board of the Youth Science Center in Fullerton. The center has an annual hobby fair that runs the gamut from rock collecting to ballooning. Fullerton hams show off VHF, UHF, and HF, but they also put a couple of transmitters around the grounds. Several hams bring their DF gear. They show the kids how to use it and turn them loose. "Some of them think it's boring," says Moell, "but others think it's really great. It may be their only real exposure to radio."

Those who hunt in urban areas curse reflections from buildings. Because VHF and UHF signals bounce off buildings, they're hard to "localize." But, says Joe Moell, reflections are just "part of the fun." More than one ham has confused hunters by setting up a fox near a building and aiming a beam antenna right at the building.

And although the hunt is sometimes frustrating, the social activities that follow are a time of spirited discussions, fish stories (fox stories), and plans for the future. And isn't that what Amateur radio is all about?

UPGRADE!

(Continued from page 3)

license—without a code requirement—would change the public perception of Morse. We were right. The no-code Technician class license has proved to be the "shareware" for Amateur Radio.

Once the newcomer gets a "taste" of our hobby, they want more. There are far more "no-coders" upgrading to higher license classes than even NARA could have predicted.

Recognizing this trend, the National Amateur Radio Association has just introduced a new book called **UPGRADE!** It was written specifically for the newcomer to assist them in upgrading to the Technician-Plus (plus 5 WPM) and General Class license. It is selling out as fast as dealers can put it on the shelf!

UPGRADE! was written by Don Stoner, W6TNS, in his usual "let's learn this instead of memorizing" style. The pattern of the book is very similar to that followed in *The Ham Radio Handbook*, for those wishing to earn the no-code license.

Don opens the book with an introduction intended to familiarize the reader with the various license classes available to those wishing to upgrade. There is also a discussion of the various test Elements which lead to the higher license classes.

The chapter on learning the code digs into the background of how telegraphic codes were developed and features an in-depth look at the "inventor," Samuel F.B. Morse. *Communicator* columnists Fred Maia, W5YI, and Gordon West, WB6NOA, contribute tips on how to best learn the code.

Following this, Stoner launches into a discussion of the theory behind the questions found the Gen-

eral Class multiple-choice written exam (3B). Each chapter relates to one of the nine subelements in Element 3B. The questions, along with the four multiple choice answers, are given at the end of each chapter. The correct answer key is located at the end of the book.

Many paragraphs include bracketed references to the test questions. For example, a paragraph describing the solar flux index is followed by the notation (3BC-7.6)(3BC-7.7), indicating that the paragraph provides the answer (and explanation) of these two questions. The material included on the single-sideband communication mode is far more extensive than required to pass the test. However, since most of the readers of **UPGRADE!** will want to operate this mode on the high-frequency bands, Stoner believes the information is interesting and will be useful.

UPGRADE! is profusely illustrated with drawings, photographs of Amateur Radio equipment and even telegraphy memorabilia from the 1800s.

UPGRADE! is available at virtually all Amateur Radio dealers and many bookstores for just \$9.95. If it's more convenient, you can order by mail from NARA—just add \$2.00 to cover shipping and handling.

UPGRADE! is also included in the "NARA Upgrade Package," along with General Class and Morse testing software, the FCC Rules and Regulations, Part 97, and more. This complete upgrade package is available through most Amateur Radio equipment dealers for only \$29.95. You can order direct from NARA, just add \$3.00 for shipping and handling.

LETTER FROM HOME

(Continued from page 13)

want to for all the pleasures and benefits it brings. Besides, how else are you going to get all those great letters?

For more information on getting your Amateur license, taking your tests and learning the Morse code, contact the National Amateur Radio Association at 1-800-468-2426 or write PO Box 598, Redmond, Washington 98052-0598. *Do it today!!!*

AVAILABLE FROM NARA

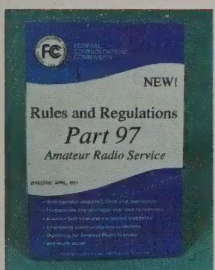


The Ham Radio Handbook

by Donald L. Stoner, W6TNS, is the leading book for anyone wishing to earn the new code-free Technician license. Includes every question you might be asked during

a test session, plus the multiple-choice answers.

The Ham Radio Handbook is the only test manual that explains in detail why the correct answer is correct. Includes simple and easy-to-understand theory along with many photos and drawings. The book divides the test questions by subelement, devoting a chapter to each. The appropriate test questions and answers are given at the end of each chapter. The list of correct answers is included at the end of the book. Guaranteed to provide all the information needed to get your ham radio license. **The Ham Radio Handbook** is only **\$9.95 (\$2.00 S&H) #B610**.



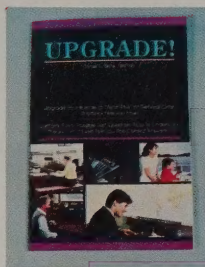
The Rules of the Road

It took the Federal Communications Commission nearly two years to completely overhaul the Amateur Radio Service Rules to reflect current technology and Amateur operations. The FCC also deleted

many unnecessary, obsolete, and redundant rule provisions.

The new rules have now been totally reorganized and revised into Part 97 of Title 47 CFR (Code of Federal Regulations) which covers all rules and regulations governing the Amateur Radio Service. Learn about the guidelines for emergency communications, required equipment standards, operator responsibilities and restrictions, and much more. Over 60 pages of information—a must for every Amateur to have in the ham shack. **Rules and Regulations, Part 97, Amateur Radio Service** is only **\$4.95 (\$1.00 S&H) #B640**.

Order Today!



UPGRADE! Shows You How Easy It Is To Upgrade!

UPGRADE!, a new book by Donald L. Stoner, W6TNS, that shows "no-code" hams how easy it is to upgrade to the Tech-

Plus or General Class license.

UPGRADE! was written to encourage learning, rather than memorization. There are nine chapters covering each subelement of the General Class exam. All multiple-choice questions and answers for the General Class exam are included. Every chapter provides you with simple-to-understand discussions explaining the theory behind each exam question.

UPGRADE! also contains a chapter describing the different Amateur Radio license classes, descriptions of the Elements (tests) which must be passed to move to a higher license class, and an extensive history of Morse code. Fred Maia, W5YI, and Gordon West, WB6NOA, provide their favorite tips on learning Morse code to help you avoid the dreaded "speed plateau" at 8 to 9 words-per-minute.

UPGRADE! is available from all major Amateur Radio equipment stores, or you can order direct from NARA for only **\$9.95 (\$2.00 S&H) #B620**.

Practice The Code With These Outstanding Code Tapes!

These tapes will help give you the practice you need to pass your next code test. Each set contains two cassette tapes.

- Novice/Technician goes to 5 words-per-minute to prepare you for Element 1(A) #T710.
- General takes you from 5 to 14 words-per-minute to prepare you for Element 1(B) #T720
- Extra will take you from 12 to 24 words-per-minute to prepare you for Element 1(C) #T730.

Order your set today for only **\$11.95 (\$2.00 S&H)**.

Back Issues of The Amateur Radio Communicator

Back issues of *The Amateur Radio Communicator* are still available.

- Volume 1, Issue 1 (in very short supply) is **\$5.00 (\$1.00 S&H) #K809**.
- All other issues are **\$2.00 (\$1.00 S&H) #K810**.



ATV Secrets For Aspiring ATV'ers

ATV Secrets For Aspiring ATV'ers, written by Henry Ruh, KB9FO, contains everything you wanted to know about Amateur Television (ATV). All ham licensees can

participate in ATV—even those with the new no-code license! Amateur TV is fun and exciting. Take your home video productions and find new audiences, make new friends and get more enjoyment from your equipment. Hams should be seen as well as heard!

ATV Secrets is available through all major Amateur Radio equipment stores, or you can order from NARA for only **\$9.98 (\$2.00 S&H) #B630**.

The Flight Of OSCAR One—A True Collectors Item!

The first OSCAR satellite was little more than an orbiting shoe-box. But it carried aloft far more than just a keyer and transmitter—it also held the dreams of Amateurs everywhere for a new era in communications. Today, we enjoy worldwide contacts via sophisticated OSCARs orbiting tens-of-thousands of kilometers above the earth. Relive the launch of OSCAR One from Vandenberg Air Force Base—hear the excitement of the dedicated hams who operated the OSCAR net and listen to its greeting message, "HI," as it whirled around the globe in 1961. This historic recording is only **\$6.95 (\$1.50 S&H) #T700**.

The FCC Question Pools—All The Questions And All The Answers

Each booklet contains all the questions and answers for each license class. Does not contain any explanations. Order your booklet by license class.

- Novice and Technician classes together (all the questions for the new code-free Technician class license) **\$4.95 (S&H \$1.50) #B650**.
- General, Advanced or Extra classes just **\$3.00 each (\$1.00 S&H) #B651**.

A FREE issue of The Amateur Radio Communicator will be sent to you when you order any product from NARA! Your magazine will be mailed at a later date.

For The Fastest Service, Call NARA At 1-800-GOT-2-HAM (1-800-468-2426)

Form of Payment MC ☐ VISA ☐ Check ☐

Please Print

Name _____

Call Sign (Optional) _____

Address _____

City _____

State _____ ZIP _____

MC/VISA _____

Expires _____

Signature _____

National Amateur Radio Association
P.O. Box 598
Redmond, WA 98073-0598

Here's my order.

Don't forget to mail my **FREE** issue

of *The Amateur Radio Communicator*!

Qty.	Item No.	Description	Price	S&H	Total Price
Subtotal					
Washington residents add 8.2% tax					
Total Enclosed					

Please make your check or money order made payable to: National Amateur Radio Association

Join the National Amateur Radio Association

and receive your issues of

The Amateur Radio Communicator!

Who Reads The Amateur Radio Communicator?

- Anyone interested in obtaining an Amateur Radio license
- New Amateur Radio operators
- Public and private school teachers who want to introduce their students to Amateur Radio
- Amateurs who are now, or want to become, ham radio instructors
- VE's (volunteer license examiners) who administer the Amateur Radio exams
- Amateurs concerned about the future of the Amateur Radio Service

What Will You Gain When You Join NARA and Receive the Communicator?

- 1 You'll get the latest facts on what's happening in Amateur Radio
- 2 The knowledge to help you get the most from the Amateur Radio Service
- 3 You'll be helping to insure a solid future for the Amateur Radio Service

This means an exciting future for you as an Amateur Radio operator!

Here's What You'll Find in the Communicator!

The Amateur Radio Communicator will include clear and informative articles on topics such as:

- Passing the Amateur Technician Class exam
- Erecting your first antenna
- Different types of Amateur communications
- Getting materials for your radio classes
- Classroom demonstration techniques
- Obtaining commercial support for your classes
- Keeping your students motivated
- Publicizing your Amateur Radio class
- The latest details on rules and regulations
- Up-to-date information on the VE program
- The latest news on proposed changes to the Amateur Radio Service
- Repercussions that regulation changes will have on the future of Amateur Radio

NARA publishes the only non-commercial ham magazine that addresses these subjects in a simple-to-understand manner.

What's NARA Doing?


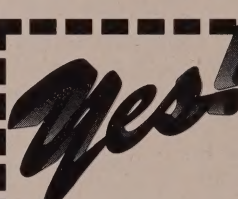
The goals of NARA are to:

- Get more people licensed in the Amateur Service.
- Save the various Amateur bands (frequency ranges) from confiscation by commercial interests.

▶ In the past year, Amateur Radio has lost part of the 220-MHz band and, in some areas of the country, is in the process of *losing access* to another band (900 MHz).

NARA is striving to get more people involved in the Amateur Service so we can increase activity and retain our remaining Amateur bands.

When you join NARA, your membership dollars will be used to *further these goals*. Let's face it—with a subscription cost of only \$10.00 per year, *you won't find a better value in Amateur Radio!!* Join today! It's easy. Just complete the subscription form below and mail your check or money order. For the fastest service, call 1-800-GOT-2-HAM (1-800-468-2426) with your Visa or MasterCard number.



NARA
NATIONAL AMATEUR RADIO ASSOCIATION
P.O. Box 598
Redmond, WA 98073-0598

I want to join NARA and receive my bimonthly subscription to *The Amateur Radio Communicator*.

☐ One year for \$10.00
☐ Two years for \$18.00
☐ Three years for \$25.00

(Please print) Form of Payment MC ☐ VISA ☐ Check ☐

Name Call

Address

City

State ZIP

MC/VISA Expires

Signature

Please make your check or money order made payable to:
National Amateur Radio Association



NARA
NATIONAL AMATEUR RADIO ASSOCIATION
P.O. Box 598
Redmond, WA 98073-0598

NONPROFIT ORG.
U.S. POSTAGE PAID
DALLAS, TX
PERMIT NO. 4258

MBR#1057 LAST:Nv/De 94
J. A. Maxwell
W6CF
PO BOX 473
Redwood Estates CA 95044-0473